

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-44. (Cancelled)

45. (New) A method for classifying a plurality of images, comprising:  
providing a working set of images;  
prior to a user performing any classification of the working set of images, automatically sorting the working set of images into a plurality of groupings based on common features of the working set of images and displaying such groupings; and  
after automatically sorting the working set of images into groupings, receiving input from the user to manually classify at least a subset of the working set of images facilitated by the displayed groupings.

46. (New) The method of claim 45, wherein the groupings are initially displayed as a plurality of elements, wherein each element specifies a number that indicates how many of the working set of images are grouped together.

47. (New) The method of claim 46, wherein each element is selectable by the user to thereby display the corresponding one or more working set of images that are grouped together.

48. (New) The method of claim 45, further comprising:  
providing a training set, wherein the training set is formed from the user's manually classified subset of the working set of images; and  
automatically classifying the unclassified working set of images based on a plurality of features extracted from the training set and the working set of images and the user's manual classification of the training set.

49. (New) The method of claim 48, further comprising displaying a visual representation of a comparison between the automatic classification and the manual classification performed by the user.

50. (New) The method of claim 49, further comprising receiving input from the user to alter the training set based on the displayed visual representation of the comparison between the automatic classification and the manual classification performed by the user so that the automatic classification more closely matches the manual classification.

51. (New) The method of claim 49, further comprising receiving input from the user to alter one or more parameters of the automatic classification based on the displayed visual representation of the comparison between the automatic classification and the manual classification performed by the user so that the automatic classification more closely matches the manual classification.
52. (New) The method of claim 51, wherein altering the one or more parameters of the automatic classification includes graphically manipulating one or more images.
53. (New) The method of claim 48, further comprising automatically classifying a second working set of images based on a plurality of features extracted from the training set and the second working set of images and the user selected classes of the training set.
54. (New) The method of claim 48, wherein the common features used during the automatic sorting include one or more of a group consisting of size, brightness, color, shape, texture, moment of inertia, context, proximity to wafer features, proximity to other defects, connectivity to adjacent features, connectivity to other defects, and yield relevant properties derived from the corresponding image.
55. (New) The method of claim 45, wherein the common features used during the automatic sorting include defect coordinates in wafers.
56. (New) The method of claim 45, wherein the common features used during the automatic sorting include defect coordinates when spatial cluster analysis is used.
57. (New) The method of claim 45, wherein common features used during the automatic sorting include information derived from one of the processing history, yield relevance, and origins of defects.
58. (New) The method of claim 45, wherein automatically sorting the working set of images includes using a Kohonen map technique.
59. (New) The method of claim 58, wherein the Kohonen map is seeded with non-random numbers.
60. (New) The method of claim 58, wherein displaying the groupings includes arranging the working set of images to reflect the Kohonen map's layout.

61. (New) The method of claim 58, wherein displaying the groupings includes arranging the working set of images into natural groupings or clusters.
62. (New) The method of claim 45, wherein automatically sorting the working set of images includes using a K-means technique.
63. (New) The method of claim 45, wherein automatically sorting the working set of images includes using a spatial signature analysis technique.
64. (New) The method of claim 45, wherein automatically sorting the working set of images is based on a plurality of cluster features that each represent a cluster of the working set of images.
65. (New) The method of claim 48, further comprising receiving input from the user or automatically receiving input for selecting a number of features to use for the automatic sorting and/or classification and applying such selected feature number to the automatic sorting and/or classification.
66. (New) The method of claim 45, wherein the common features used during the automatic sorting include tool history information relating to an inspection system or tool history information relating to the past success rate of the classification step.
67. (New) The method of claim 45, wherein the working set of images originate from a semiconductor inspection process.
68. (New) A system for classifying a plurality of images, comprising:  
a software portion configured to provide a working set of images;  
a software portion configured to prior to a user performing any classification of the working set of images, automatically sort the working set of images into a plurality of groupings based on common features of the working set of images and displaying such groupings; and  
a software portion configured to after automatically sorting the working set of images into groupings, receive input from the user to manually classify at least a subset of the working set of images facilitated by the displayed groupings.
69. (New) The system of claim 68, wherein the groupings are initially displayed as a plurality of elements, wherein each element specifies a number that indicates how many of the working set of images are grouped together.

70. (New) The system of claim 69, wherein each element is selectable by the user to thereby display the corresponding one or more working set of images that are grouped together.

71. (New) The system of claim 68, a software portion configured to:  
provide a training set, wherein the training set is formed from the user's manually classified subset of the working set of images; and  
automatically classify the unclassified working set of images based on a plurality of features extracted from the training set and the working set of images and the user's manual classification of the training set.

72. (New) The system of claim 71, a software portion configured to display a visual representation of a comparison between the automatic classification and the manual classification performed by the user.

73. (New) The system of claim 72, a software portion configured to receive input from the user to alter the training set based on the displayed visual representation of the comparison between the automatic classification and the manual classification performed by the user so that the automatic classification more closely matches the manual classification.

74. (New) The system of claim 72, a software portion configured to receive input from the user to alter one or more parameters of the automatic classification based on the displayed visual representation of the comparison between the automatic classification and the manual classification performed by the user so that the automatic classification more closely matches the manual classification.

75. (New) The system of claim 74, wherein altering the one or more parameters of the automatic classification includes graphically manipulating one or more images.

76. (New) The system of claim 71, a software portion configured to automatically classify a second working set of images based on a plurality of features extracted from the training set and the second working set of images and the user selected classes of the training set.

77. (New) The system of claim 71, wherein the common features used during the automatic sorting include one or more of a group consisting of size, brightness, color, shape, texture, moment of inertia, context, proximity to wafer features, proximity to other defects, connectivity to adjacent features, connectivity to other defects, and yield relevant properties derived from the corresponding image.

78. (New) The system of claim 68, wherein the common features used during the automatic sorting include defect coordinates in wafers.
79. (New) The system of claim 68, wherein the common features used during the automatic sorting include defect coordinates when spatial cluster analysis is used.
80. (New) The system of claim 68, wherein common features used during the automatic sorting include information derived from one of the processing history, yield relevance, and origins of defects.
81. (New) The system of claim 68, wherein automatically sorting the working set of images includes using a Kohonen map technique.
82. (New) The system of claim 81, wherein the Kohonen map is seeded with non-random numbers.
83. (New) The system of claim 81, wherein displaying the groupings includes arranging the working set of images to reflect the Kohonen map's layout.
84. (New) The system of claim 81, wherein displaying the groupings includes arranging the working set of images into natural groupings or clusters.
85. (New) The system of claim 68, wherein automatically sorting the working set of images includes using a K-means technique.
86. (New) The system of claim 68, wherein automatically sorting the working set of images includes using a spatial signature analysis technique.
87. (New) The system of claim 68, wherein automatically sorting the working set of images is based on a plurality of cluster features that each represent a cluster of the working set of images.
88. (New) The system of claim 71, a software portion configured to receive input from the user or automatically receiving input for selecting a number of features to use for the automatic sorting and/or classification and applying such selected feature number to the automatic sorting and/or classification.

89. (New) The system of claim 68, wherein the common features used during the automatic sorting include tool history information relating to an inspection system or tool history information relating to the past success rate of the classification step.

90. (New) The system of claim 68, wherein the working set of images originate from a semiconductor inspection process.